# Evaporation Apparatus For Solvent Fuel

## FIELD OF THE INVENTION

The present invention relates to an evaporation apparatus for solvent fuel, and more particularly, to an evaporation apparatus having a fuel container in which the fuel being maintained at a predetermined height so as to keep the fuel density at a constant value thereby reducing the heat loss and supplying the fuel rapidly for combustion.

## DESCRIPTION OF THE PRIOR ART

It is a common practice and one of the most efficient heating manners to evaporate the liquidal fuel in a fuel tank into gaseous state before being supplied to the burner.

As shown in Fig. 1, an ordinary fuel tank 1 in which storing a solvent fuel 11 is provided with a heating plate at the bottom of the tank 1 thereof for heating the solvent fuel 11. The temperature in the tank 1 is controlled at a constant value within the range of evaporation temperature of the solvent fuel 11. The air is conducted into the tank 1 from its top end by means of a blower 12 so as to evaporate the solvent fuel 11. The gaseous fuel is conducted into a gas burner or a boiler via an output pipe for combustion. It is found out that the aforesaid conventional way of transforming the liquidal fuel into gaseous fuel

for combustion has following shortcomings:

1. The fuel contained in the fuel tank will be reduced from time to time causing the density of the fuel in the tank unstable that might affect the efficiency of combustion or even shorten the lifetime of the heating device.

   As the bottom portion of the solvent is bubbled by agitation of air supplied by the blow pipe, and the gaseous fuel is therefore brought up to the surface of the liquidal fuel, if the amount of fuel contained in the tank gradually decreases after a long time combustion, the gaseous fuel carried away by the bubbles also decreases. As a result, the concentration of the gaseous fuel in the tank becomes smaller and smaller to cause an unstable combustion.

2. The whole fuel in the tank must be heated for a long time every time of combustion so as to evaporate the fuel. By doing so, the heat loss is increased and the concentration of the gaseous fuel cannot be kept stable by reason that for heating the whole amount of fuel contained in a single tank to the evaporation temperature usually needs a long time. The inadequate heating causes the concentration of the gaseous fuel in the tank being unable to reach the standard state resulting in an unstable combustion.

It is what the reason the inventor has endeavored for years trying to find out the way to improve the shortcomings of the above mentioned prior techniques, and at last has succeeded in realizing the present invention.

## SUMMARY OF THE INVENTION

Accordingly, the object of the present invention is to provide an evaporation apparatus for solvent fuel with an extra fuel reservoir installed outside of the evaporation tank, and a fuel level controller for controlling the amount of fuel in the evaporation tank is equipped therein so as to maintain the concentration of gaseous fuel in the evaporation tank in a preferable state for stable combustion.

To achieve this object, the fuel level controller of the evaporation apparatus for solvent fuel is composed of a float bowl and a gate switch, the on/off of the latter is controlled by the position of the former which in turn controls the amount of fuel contained in the evaporation tank.

In the present invention, a heating strip is installed outside of the lower end of the evaporation tank, the heating strip is connected with a temperature controller having an inner rod shaped temperature gage to control the inner temperature of the evaporation tank stably at a constant value.

In the present invention, it has only to heat a small amount of fuel in a short heating time so that the temperature can be easily controlled and the quality of the fuel is upgraded by maintaining the concentration of gaseous fuel stably.

The above object and other advantages of the present invention will become more apparent by describing in detail the preferred embodiment of the present invention with reference to the attached drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a cross-sectional view of a conventional evaporation tank.

Fig. 2 is the three-dimensional view of the present invention.

Fig. 3 is an illustrative view showing how to operate the evaporation apparatus of the present invention.

Fig. 4 is the three-dimensional view in another embodiment of the present invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIEMNTS

Referring to the Fig. 2, the evaporation apparatus of the present invention comprises an evaporation tank 2, a fuel reservoir 3, and a liquid fuel level controller 4. A blower motor 21, a pressure switch 22, and a gaseous fuel exit 23 are installed on the top surface of the evaporation tank 2. One end of the blower motor 21 is connected to an air inlet pipe 24 to introduce the air into the apparatus and the back flow of the air and the gaseous fuel is prevented by a check valve 25. The air inlet pipe 24 introduces the air into the evaporation tank 2 from its bottom so as to promote evaporation of the fuel. The pressure switch 22 is for detecting pressure in the tank 2 and jointed to the blower motor 21 for controlling the operation of the motor 21. The gaseous fuel in the tank 2 is conducted out of the tank 2 via the fuel exit 23.

A rod shaped temperature gage 26 provided at the bottom of the

evaporation tank 2 is connected to a temperature controller 27. The temperature controller 27 is further connected to a heating strip 28 provided along outer edge of the bottom portion of the tank 2. When the temperature controller 27 has detected that the inner temperature of the tank 2 measured by the temperature gage 26 is lower than the predetermined value, it indicates the heating strip 28 to begin action until the fuel temperature is higher than the predetermined value.

A graduation 29 is provided on part of the outer surface of the tank 2 for indicating the variation about amount of fuel inside the tank 2 so as to judge if the liquidal fuel level controller 4 operates normally. A fuel relief port 291 is provided at the bottom of the tank 2 to release the fuel when the tank 2 is to be cleaned.

An air conducting pipe 31 is interconnected between the upper portion of the evaporation tank 2 and the fuel reservoir 3 so as to maintain an equal air pressure for the two containers 2 and 3. A graduation 32 is also provided on part of the outer surface of the fuel reservoir 3 for indicating amount of fuel remaining in the reservoir 3 for replenishing the solvent fuel from a fuel supply port 33 in case of need. A fuel relief port 34 is provided at the bottom of the reservoir 3 to release the fuel when the reservoir 3 is to be cleaned.

Besides, the liquidal fuel level controller 4 equipped in the evaporation tank 2 consists of a float bowl 41 and a gate switch 42, the former detects the fuel level and actuates the latter. A fuel supply pipe 43 is interconnected

between the lower portions of the fuel reservoir 3 and the evaporation tank 2. The end of the fuel supply pipe 43 is connected to the gate switch 42 so as to control amount of fuel supplied to the tank 2.

As the inner pressure of air conducting pipe 31 which interconnects the tank 2 and reservoir 3 is always maintained at a constant value which can prevent reverse flow of the fuel, when the float bowl 41 of the liquidal fuel level controller 4 detects the level of the liquidal fuel being decreased below the predetermined height, the gate switch 42 is actuated to force the liquidal fuel in the reservoir 3 to flow into the tank 2 via the fuel supply pipe 43, until the liquidal fuel level controller 4 detects that the fuel level in the tank 2 has reached the predetermined height and closes the gate switch 42 to stop fuel supply. In this manner, the fuel in the tank 2 maintains at a fixed height by the liquidal fuel level controller 4 thereby shortening the heating time and maintaining concentration of the gaseous fuel in the evaporation tank 2 stably at a constant value.

In the present invention, by means of effectively controlling the amount of fuel in the evaporation tank 2 with the liquidal fuel level controller 4 installed therein, the variation of quantity of fuel is also regulated in a fixed range. In this manner, the heating of fuel can only be carried out with respect to this range thereby the concentration of the fuel in the tank 2 is easily controlled. In other words, the fuel contained in the tank 2 can always be held at a constant level to perform a stable evaporation effect to achieve a stable combustion efficiency. Should the gaseous fuel produced by the apparatus of the present

invention be supplied to a gas burner 61 and a boiler 62 shown in Fig. 3, the combustion efficiency would be largely improved with a prolonged lifetime.

The graduations 29 and 32 respectively provided with the tank 2 and reservoir 3 indicate the respective fuel level thereof and they are observable by naked eye so as to replenish new fuel from time to time.

In another embodiment of the present invention shown in Fig. 4, the liquidal fuel level controller 73 is not equipped in the evaporation tank 2, but instead of it, installed in a fuel supplier 7 interposed between the evaporation tank 2 and the fuel reservoir 3 and is connected to the former with a pipe 74 and to the latter with a pipe 75 respectively, and an extension pipe 76 is uprightly erected to communicate with the pipe 31 for balancing the internal pressure of the tank 2 and the reservoir 3. The liquidal fuel level controller 73 is composed of a float bowl 71, and a gate switch 72.

In all, the evaporation apparatus for solvent fuel of the present invention successfully utilizes the liquidal fuel level controller in the evaporation tank to control fuel level in a predetermined range so as to maintain concentration of the gaseous fuel stably and improve the combustion efficiency.

Those who are skilled in the art will readily perceive how to modify the invention. Therefore, the appended claims are to be construed to cover all equivalent structures which fall within the true scope and spirit of the invention.